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II.—*Reise um die Erde, &c. Travels round the World by Way of Northern Asia and the Atlantic and Pacific Oceans, in the Years* 1828-30. By ADOLPH ERMAN. 2nd vol. Berlin, 1838.

AMONG the numerous books of travels which, during the last quarter of a century, have issued from the press, it would be difficult to select one that has added more to our knowledge of geography, in its most extended and in its only correct sense, than the work before us. A devoted follower of the school of Humboldt, Professor Adolph Erman has closely followed in the luminous track of his great master, and has set an example to modern travellers that they will do well to endeavour to imitate. Fully impressed with the conviction that it is by diligent study of the physical geography of the globe that we can alone hope to obtain a correct acquaintance with its great leading features and with the laws that influence the distribution of animal and vegetable life, Professor Erman has devoted much time and labour expressly to this subject, and, although his route lay through the desert of Siberia, which might at first sight be considered a sterile and unpromising country, the result of his journey is a highly philosophical and sterling work, every chapter of which is replete with geographical information.

On a former occasion * we briefly traced the steps of M. Erman throughout European Russia, from St. Petersburg to Moskow, Kasan, and Peru, thence across the Ural mountains to Tobolsk, where he obtained accounts of the great steppe of the Kirghis, through which exists a regular commercial intercourse to Tashkend in Khokan, and of the wandering tribes that inhabit that region, with his descent of the Obi to Obdorsk, near the shores of the Polar Sea;—we have now to accompany him by a less beaten path, and therefore, to a geographer, by one of even higher interest, throughout Asiatic Russia to the shores of the Pacific Ocean.

Quitting Tobolsk in the depth of a northern winter, M. Erman travelled in a south-eastern direction across the stoneless plains that surround the capital of Western Siberia, and, gliding rapidly in his sledge over the frozen marshes of Barabinsk and the snow-clad steppes beyond, he reached the town of Tomsk, situated on the eastern bank of the Obi, on the evening of the 16th day; three days more brought him to Krasnoyarsk at the confluence of the Kacha with the Yenisei—and in this valley the improvement in soil forms a striking contrast to the sameness of the road he had hitherto travelled; a great improvement is also manifest in the style of building and in the civilization of the people.

" The low plain on which Krasnoyarsk is built is bounded by the

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* Journal, vol. VI. p. 387.

Yenisei and the Kacha. A precipitous acclivity forms the northern and longest side of the obtuse point of land between the two rivers. To the east it joins on to the mural cliffs of red marl (krasnoï yar) which form the left bank of the Yenisei, and which gives its name to the town. On the right bank of the river is a plain 7 wersts wide, and bounded to the S.W. with distant blue mountains, whose lofty and picturesque outline indicates a rock formation. In the river near the town are three islands, covered with woods of acacia, quince, and plum."—p. 29.

From Krasnoyarsk M. Erman journeyed again in a S.E. direction, and, passing through Kansk, Nijneï Udinsk, in the parallel of 55°, where in the morning of the 3rd of February the quicksilver of his artificial horizon presented a solid surface; and Telma, with its gigantic cloth-manufactory which employs 800 exiles, he reached Irkutsk, a distance of about 1600 miles in thirty-three days from Tobolsk.

This chief city of Eastern Siberia is situated on level ground on the eastern bank of the river Angará, here 330 yards wide at its junction with the Irkút, in lat. 53° 14′ N., at an elevation of 1240 English feet above the sea, and about 30 miles from the north-western shore of the lake Baikal, the mean temperature for the year being —0.3 Réaum., or rather below the freezing point.

The great lake Baikal, at an elevation of 1350 English feet above the sea, extends in a N.E. and S.W. direction, about 350 geographical miles, with an average breadth of 35 miles, of which the Angará, flowing northwards to the Yeniseï and the Icy Sea, is the great outlet.

On the 12th of February M. Erman started to cross this frozen inland sea on his road to Kiakhta, the frontier-town between China and Russia. The road leads in an E.S.E. direction, by Ilinsk and Verchnei Udinsk, up the valley of the Selenga, bounded by lofty mountains, for some distance; then turning round to the southward passes by Selenginsk, and continues gradually ascending till at Kiakhta the level is 2220 feet above the sea; between Ust-Kiakhta and Troizko Sawsk, on the Chinese frontier, the barometer showed a difference of 608 feet.

In describing the physical geography of this part of the country, M. Erman says:—

"During the next 120 miles from Irkutsk towards China the ground rises 978 feet; from that spot it ascends more rapidly as far as the parallel of the Mongolian town Urga, and the elevation of nearly 3000 feet which one has there attained remains unchanged for upwards of 300 miles farther towards the S., within the barren steppe of the desert of Gobi: the road to Pekin first reaches the precipitous southern declivity of this elevated plateau, in the 42nd parallel near the town Dyan-sya-keu.

"It is this elevated dry table-land which produces the dry climate at Irkutsk: the S. winds which begin to blow in October are so dry, that they cause the floors and other wood-work in the houses to split; and we learn from Dobell and other travellers that the N. wind produces a similar effect in Canton—these two winds having their source in this high Mongolian steppe."—pp. 67, 68.

At Kiakhta and at Troïzko Sawsk, on the borders of the Celestial Empire, M. Erman remained from the 16th to the 22nd of February; and during this time visited Maimachen, or the Chinese town, which is separated from the Russian town by a high wall, which marks the limits of the two empires. During his stay here he had an opportunity of studying the manners and customs of the Buraets, a nomade nation of the Mongolian desert, who appear to be a race comparatively wealthy in flocks and herds. The 11th chapter is devoted to these subjects, and to a visit paid by our author on his return towards Irkutsk to the Chamba Lama, the high priest of the Mongols, who dwells in a picturesque valley not far from the south-western end of the lake Baïkal. The religion professed by the Mongols is said to resemble very much the worship paid to Buddha in India.

On the night of the 7th of March a slight shock of an earthquake was experienced at Irkutsk.

Again quitting Irkutsk on the 19th of March, M. Erman pursued a north-north-easterly course across the hilly country which separates the basins of the Angará and the Lena, here not 100 miles apart, till he reached the village of Kachuga on the eastern bank of the latter river. In the journey across this tract of land, of special interest, as containing the sources of the river Lena, Olsonsk was found to be 434 feet, Bagendaisk 524 feet, Kogotsk 371 feet, Mansursk 363 feet, and Kachuga only 261 feet above the level of Irkutsk, or 1510 feet above the sea. From Verkolensk, 30 versts lower down, M. Erman continued the descent of the frozen river in his sledge on the ice: his barometric measurements therefore indicate the fall of the Lena for upwards of 1000 miles as far as Yakutsk; during which he found the frozen surface at Verkolensk at 1426 feet, Tiumenowsk 1140 feet, Kirensk 780 feet, Vitimsk 595 feet, Beresowsk 448 feet, Olekma 410 feet, and Yakutsk 307 feet above the level of the Icy Sea.

From the 8th to the 23d of April, Professor Erman remained in the town of Yakutsk, a full account of which, with a comparison between the Yakut, the Tartar, and Mongolian languages, may be found in his 13th chapter. It was during his stay here that he took advantage of the opportunity afforded him by a deep well to ascertain that the ground was still perpetually frozen at the depth of 400 feet from the surface; indeed, as it was found that the mean temperature of the place was − 6 Réaumur, or $+ 18\frac{1}{2}$ Fahr., M. Erman expresses that he could not expect to find the ground thawed until he had reached a depth of 600 feet. The winter of 1827, which was selected for his observations, was a *temperate* winter, for in 1828 the temperature of January was – 35°.7 Réaumur, or – 48° Fahr., in the warmest part of the day, and the mercury did not thaw for *three months together:* in ordinary years it is only solid for two months.

M. Erman says:—

"The inhabitants of the Swiss Alps would with justice complain of their hard lot if they were compelled to live at a height of 10,000 feet, or 2300 feet above the Hospice of the Great St. Bernard, and there feed and warm themselves with the animal and vegetable productions of the surrounding mountains; but they would be only living upon ground of the same temperature which I have found between the houses of the shepherds of Yakutsk! And we might apparently draw the conclusion that what is impossible in Europe is common in Siberia, if we did not take into consideration that a similar temperature of soil is constituted in different places of different elements.

"Yet with this degree of cold we have at Yakutsk, which is in 62° 1′ 30″ N. latitude, as much as 128 days wholly without frost; and during this period of the year vegetable life is not only undisturbed, but is favoured and pushed forward in an extraordinary manner by a steady and rapidly increasing temperature. In mountainous countries, and in the northern regions of Europe, corn ceases to be cultivated only where the mean temperature of one of the three summer months is below + 7° Réaum.; but in Yakutsk, in the months of June, July, and August, we have a mean temperature of + 11°, + 15°, and + 13° Réaum., and very often the thermometer in the shade shows + 20 Réaum. (77 Fahr.) In the year 1827 this was the case for 44 days.

"This powerful influence of the sun is very sensibly felt by the inhabitants: several kinds of grain, and particularly a summer wheat (jänza), and rye, are sown by the Russians in the vicinity of the city. The country is then thawed to a depth of 3 feet below the surface, and, while it rests on strata in a state of perpetual frost, it yet produces on an average fifteen-fold, and in some cases forty-fold. Mr. Amwrossow, the chief priest of Yakutsk, assured me, that the cultivation of corn would be very much increased if they could divert the Yakuts from a nomadic life. It seems that this extraordinary fertility of the soil is owing, partly to its composition, which is entirely alluvial, partly also to the effect of the frost in rendering it fertile and friable, and in part to the water, which in the spring trickles over the whole surface, and which finds no escape through the frozen strata below. In the gardens of the city they rear potatoes, cabbage, many kinds of esculent roots, radishes, and cucumbers; but the grasses are of still greater importance, for the support of the Yakut flocks and herds: we may mention also the magnificent forests of larch to the east of the city, where are found in abundancee fur-clothed animals, and wood for building as well as for fuel."

Quitting Yakutsk on the 23d of April, M. Erman kept in an easterly direction across the Aldan mountains, towarks Okotsk.

From the valley of the Lena the ground at first is hilly, and, although both Talbuyaktask at 18 miles, and Tagulinsk at 30 miles, are from 50 to 100 feet lower than Yakuzk, the rise from this latter point is continual but gradual to Nokinsk, on the heights forming the western banks of the Aldan river, where it attains an elevation of 750 feet above the sea, whence it falls rapidly to the valley of the Lena, which at Aldanski Perevos, on its eastern bank, is 422 feet above the sea. At Lebegine, a village half-way between these two rivers, and 614 feet above the sea, M. Erman found its latitude to be 62° 11′ 30″, or 10 miles to the northward of the parallel of Yakutsk: whereas in the latest maps it *was* (and in England it is to be feared we must still say it *is*) laid down 51 miles to the southward of that place; and this occurs on the high road to Okotsk, which may serve as a sample of our ignorance of the geography of these regions, and of the value of a journey undertaken by so intelligent an observer as M. Erman, throughout his travels, has proved himself to be.

On the eastern banks of the Aldan river the mountain-range, which derives its name from the stream, rises with a steep ascent. At a night's halt, four versts beyond Bielski Perevos, it is 762 feet, and the following heights above the sea were observed on the journey:—

	Feet.		Feet.
1st mountain E. of Perevos . .	970	The lake Tungor	2442
2nd idem	1500	Mountain-pass 5 m. W. of Koinya	2608
Chernolyes	985	Koinya	2238
Garnastak	1530	Kapitan (highest point of Aldan mountain)	4263
Allakyuna	1912	Ketanda	2750
Ulagchan	2710	Arki	908
Larch forest (limit of) . . .	2240	Meta	166
Single larches	2494		
Ancha	2391		

Okotsk, 13 feet above high water in the Pacific.

From Mount Kapitan, the highest point of this part of the Aldan mountains, the ground continues at a level of about 2500 feet as far east as Ketanda, about 100 miles from Okotsk, whence it descends rapidly to the shores of the Great or Pacific ocean.

Vast forests of larch *(Pinus larix)* clothe the sides of the Aldan mountains, and, in the latitude of 61° N., attain an elevation of 2240 feet; fine single trees reach to 2500 feet; and on Mount Kapitan M. Erman hung his barometer up to a tall and well-grown larch tree, at 4028 English feet above the sea!

In their geological character, the Aldan mountains, where M. Erman crossed them, may be divided into three principal groups, namely, limestone from the valley of the Aldan to the sources of the Biela; greywacke from thence as far as Ketanda; and the porphyry-formation, with sienite and granite, from Ketanda to the level of the sea.

From Yakutsk M. Erman travelled with horses under charge of his Yakut guides for about 200 miles direct distance, as far as Garnastak on the western side of the Aldan range: he here changed his mode of travelling for the fleeter reindeer, and with a herd of twelve of these noble animals pursued his journey through the mountain-range under charge of a Tunguse guide. Shortly after reaching the eastern foot of the range, our traveller exchanged his reindeer for a long train of Chukchi dogs, which dragged him down the rather rapid descent from Arki to the shores of the Pacific Ocean.

Our limits forbid us to follow M. Erman to the peninsula of Kamchatka, which we the less regret as we have not yet received the personal narrative of his journey, and, as he has himself given some description of the geological formation of that country in a letter (printed at p. 500 of this volume) which accompanied his donation to the Society of a well-executed map of the peninsula of Kamchatka, on the scale of three miles to a degree, drawn by M. Reinhard of the Royal Cadet Corps, and embodying, besides all other correct data, the observations made by Professor Erman himself on this remarkable journey.

III.—1. *Le Pilote Français.* 4^me^. *partie.* Paris, 1839.
2. *Exposé des Opérations Géodésiques exécutées de* 1829 *à* 1838, *sur les Côtes Septentrionales de France.* Par P. BEGAT, Ing. Hyd. de la Marine. Publié par ordre du Roi. 4to. Paris, 1839.

AMONG the various branches of geography there is none that is carried forward more steadily or more unobtrusively, while at the same time it will yield to none in the importance of its labours, than the hydrographic survey of our channels, coasts, and harbours. Hydrography may have no brilliant discoveries to record—can hold out no El Dorado to cheat her followers into forgetfulness of their toils; but it has the gratification of conferring a lasting benefit on the human race, as exact hydrographic detail is essential to the preservation of life and property—is the only safeguard to the navigation and commerce of this maritime nation—and the geographer cannot but feel a debt of gratitude to those who expose themselves to numerous privations, and not unfrequently risk both health and life, in advancing this valuable branch of the science he desires to promote.

In the second part of a memoir, published in 1829 by the title of *Exposé des Travaux,* &c., M. Daussy has already made public the geodesic operations which have served as bases for the plans and charts of the three first parts of the new "Pilote Français," comprehending the whole of the western coast of France.